



Taylor & Mulder
Property and Casualty Consulting Actuaries

Actuarial Analysis of the ADEQ Underground Storage Tank Corrective Action Program

Daniel W. Lupton, FCAS, MAAA, MBA
Vice President & Consulting Actuary
Taylor & Mulder, Inc.

About Taylor & Mulder, Inc.

- Incorporated in 1998
- Our clients include other state UST funds, as well as government entities at the local, state, and federal levels.
- The actuaries assigned to this project have over 100 years' combined experience

Scope

- Determine funding for corrective action costs for releases open as of May 1, 2014
- Determine funding for baseline assessments
- Determine funding for tank removals
- Determine number of releases identified in the future and cost of cleanup
- Project cash flows and fund balances
- Determine the value of deductibles

Scope

- Improve data collection going forward
- Projections are in pieces / “modular”
- Strategic planning of configuration of the program in Arizona in the future
 - Determine impact of various configurations

Unpaid Costs of Cleanup

Report Date	Tier 1 Cleanup	Tier 2 Cleanup	Tier 3 Cleanup
Before June 30, 2006	\$55,676,205	\$51,280,849	\$50,706,006
July 1, 2006 to June 30, 2014	\$10,491,432	\$9,248,634	\$8,594,105
Total	\$66,167,637	\$60,529,483	\$59,300,111

- Includes state-lead cleanup costs

Potential Drivers of Change

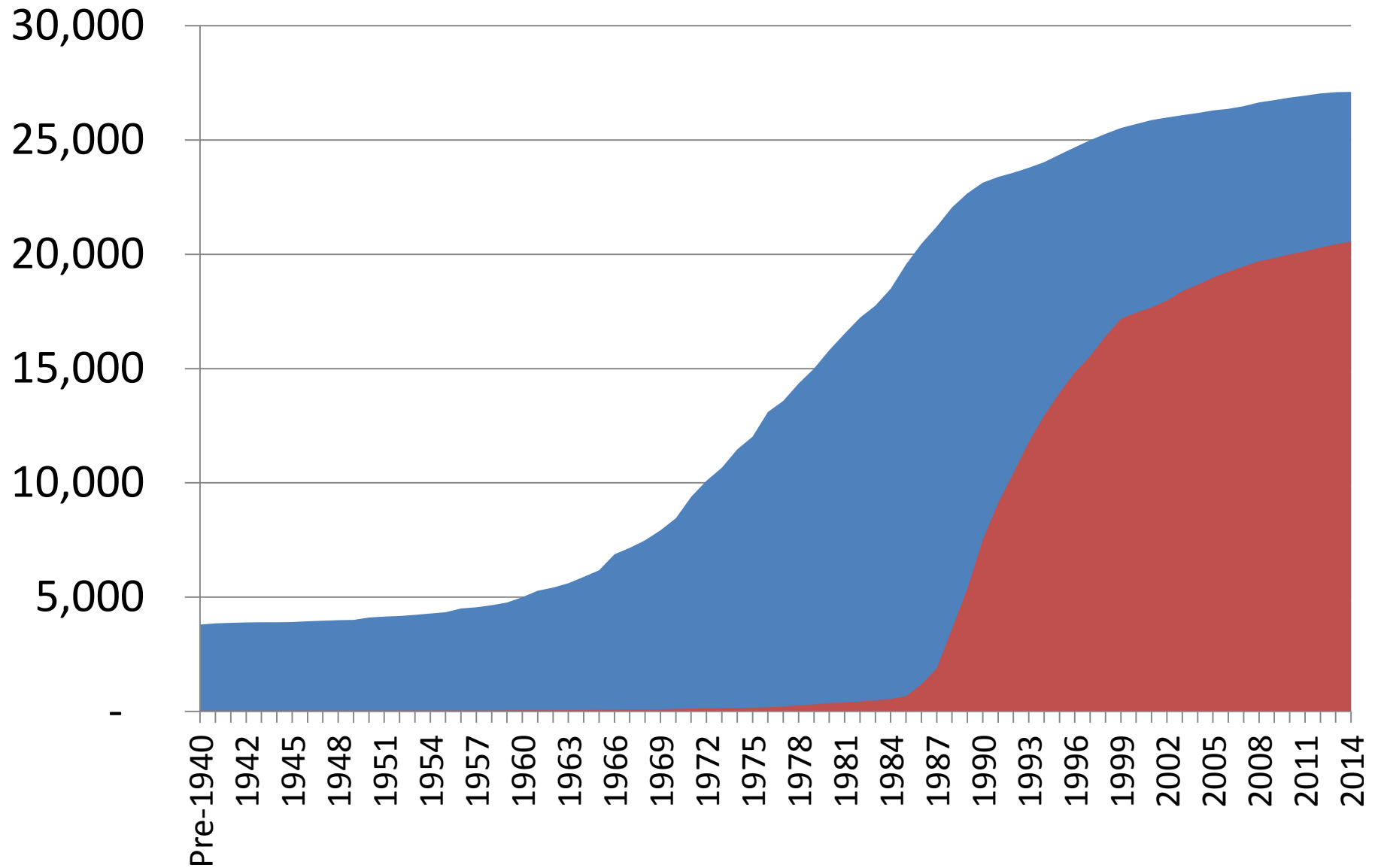
- MTBE removed in 2005
 - May have the effect of lowering costs post-2005
- ULSD and ULSG recent and upcoming additions
 - May have the effect of increasing costs
- Inflation
- Incentive effects

Cost of Baseline Assessments

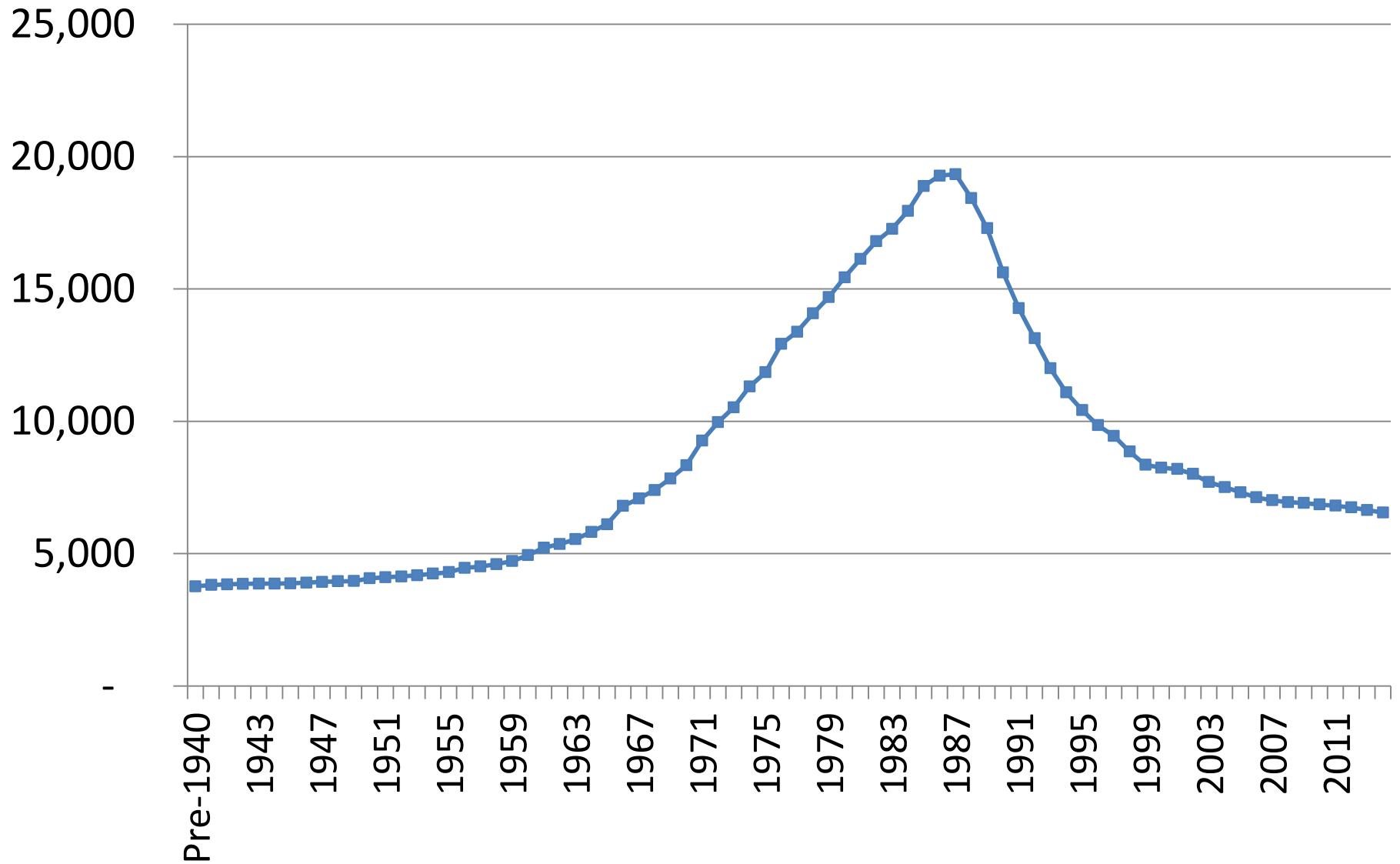
Type of Assessment	Cost
10 Vertical Borings per Site	\$38,059,692
2 Angle Borings & 4 Vertical Borings	\$38,910,857
4 Vertical Borings Only	\$32,505,376

- Majority of cost is in overhead expenses, not the actual soil borings
- Only provides a “snapshot” as opposed to a “moving image”
- Strategic considerations may make these costs unnecessary

Tanks Opened and Closed



Tanks Remaining Open



Cost of Tank Removals

Year	Tanks Removed	Cost
2015	150	\$1,375,580
2016	147	\$1,370,397
2017	150	\$1,432,843
2018	147	\$1,429,865
2019	146	\$1,452,479
2020-2024	784	\$8,164,300
2025-2029	835	\$9,607,499
2030-2035	892	\$11,323,674
Total	3,251	\$36,156,637

- Removal of risky tanks now could prevent large losses later
- May need to remove piping at same time as tanks

Future Releases (Counts)

Report Year	Releases Identified by Baseline Assessments	Releases Identified by Tank Removals	Releases Identified by Other Means
2015	366	7	72
2016	362	6	53
2017	358	7	35
2018	354	6	17
2019	0	6	17
2020-2024	0	35	83
2025-2029	0	37	77
2030-2035	0	39	71
Total	1,440	143	426

Future Releases (Counts)

- Baseline assessments expected to identify releases at 22.6% of sites
 - Anticipated to take 4 years to complete
- Releases identified through closures are low
 - From 2002-2014, only 0.9% of closures identified a release
- Releases identified through other means anticipated to decrease after baseline assessments

Future Releases (Dollars)

Report Year	Releases Identified by Baseline Assessments	Releases Identified by Tank Removals	Releases Identified by Other Means
2015	\$18,528,939	\$335,045	\$3,642,090
2016	\$18,315,078	\$327,238	\$2,700,040
2017	\$18,105,634	\$335,441	\$1,779,442
2018	\$17,915,995	\$328,180	\$880,402
2019	\$-	\$326,834	\$871,195
2020-2024	\$-	\$1,748,378	\$4,193,660
2025-2029	\$-	\$1,863,485	\$3,903,353
2030-2035	\$-	\$1,989,308	\$3,599,599
Total	\$72,865,645	\$7,253,908	\$21,569,782

- Shows cleanup costs to Tier 1 Standard

Total Future Cleanup by Report Year

Report Year	Tier 1 Cleanup	Tier 2 Cleanup	Tier 3 Cleanup
2015	22,506,074	22,238,373	22,180,901
2016	21,342,355	21,088,497	21,033,997
2017	20,220,517	19,980,002	19,928,367
2018	19,124,577	18,897,097	18,848,261
2019	1,198,028	1,183,778	1,180,719
2020-2024	5,942,038	5,871,360	5,856,186
2025-2029	5,766,838	5,698,244	5,683,518
2030-2035	5,588,907	5,522,429	5,508,157
Total	101,689,335	100,479,780	100,220,106

- Note: These values are **NOT** the cash flows by year
- These are the cost of releases reported during each year.

Anticipated Payouts (Cash Flows)

Year	Cleanup Costs	Baseline Assessments	Tank Removals	Total Cash Flows
2015	\$24,822,813	\$9,122,994	\$1,375,580	\$35,321,386
2016	\$11,095,778	\$9,122,994	\$1,370,397	\$21,589,169
2017	\$9,693,600	\$9,122,994	\$1,432,843	\$20,249,437
2018	\$9,862,815	\$9,122,994	\$1,429,865	\$20,415,674
2019	\$10,256,584	\$0	\$1,452,479	\$11,709,063
2020-2024	\$41,947,072	\$0	\$8,164,300	\$50,111,372
2025-2029	\$26,999,649	\$0	\$9,607,499	\$36,607,148
2030-2034	\$16,428,382	\$0	\$11,323,674	\$27,752,056
Total	\$151,106,693	\$36,491,975	\$36,156,637	\$223,755,305

Projected Fund Balance

Year	Projected Revenue	Cleanup Costs	Expenses	Ending Fund Balance
2015	\$29,357,473	\$24,822,813	\$17,382,327	\$9,378,622
2016	\$29,411,423	\$11,095,778	\$17,514,819	\$10,179,447
2017	\$29,465,472	\$9,693,600	\$17,717,694	\$12,233,625
2018	\$29,519,620	\$9,862,815	\$17,857,953	\$14,032,477
2019	\$29,573,868	\$10,256,584	\$8,903,675	\$24,446,086
2020-2024	\$144,220,496	\$41,947,072	\$16,071,569	\$110,647,941
2025-2029	\$138,047,647	\$26,999,649	\$18,337,763	\$203,358,177
2030-2034	\$131,748,678	\$16,428,382	\$20,962,590	\$297,715,882
Total	\$29,357,473	\$24,822,813	\$17,382,327	

Savings from Deductibles

Deductible	Tank Removals	Baseline Assessments	Cleanup Costs at Tier 1
2,500	3,789,035	5,857,500	2,520,870
5,000	7,578,069	11,715,000	4,941,872
7,500	11,367,104	17,572,500	7,225,656
10,000	15,156,138	23,430,000	9,364,047
12,500	18,945,173	29,287,500	11,351,350
15,000	22,734,207	35,145,000	13,216,222
17,500	26,523,242	36,491,975	14,976,363
20,000	30,312,277	36,491,975	16,635,826

- Savings over 20 years

Savings from Deductibles

Deductible	Total Savings at Tier 1	Total Savings at Tier 2	Total Savings at Tier 3
2,500	12,167,404	12,166,792	12,165,855
5,000	24,234,941	24,233,457	24,231,225
7,500	36,165,260	36,162,053	36,158,861
10,000	47,950,185	47,945,220	47,941,051
12,500	59,584,023	59,576,725	59,571,755
15,000	71,095,429	71,086,094	71,079,375
17,500	77,991,580	77,980,552	77,963,925
20,000	83,440,078	83,425,011	83,394,719

- Savings over 20 years

Deductibles

- Largest potential savings are in baseline assessments and tank removals
- Other deductible options available, such as deductible based on annual revenue or copay provisions (i.e., a percent deductible for the cost of cleanup)